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<p>(54) Title: METHOD AND COMPOSITIONS FOR HARD SURFACE CLEANING</p> <p>(57) Abstract</p> <p>Novel liquid hard surface cleaning compositions in the form of a homogeneous aqueous solution which comprises a glycoside surfactant, a water miscible organic solvent, a water soluble detergent builder and water and which effectively cleans soiled hard surfaces without rinsing and without leaving an objectionable residual film on such surfaces after cleaning.</p>		



-1-

## METHOD AND COMPOSITIONS FOR HARD SURFACE CLEANING

BACKGROUND OF THE INVENTION

5 The present invention relates to aqueous liquid detergent compositions and to the use of same for the cleansing of soiled hard surfaces such as appliance cabinets or housings, walls, windows and the like.

Alkyl glycoside materials such as, for example, higher alkyl monoglycosides and higher alkyl polyglycosides are known materials; are known, at least  
10 in certain circumstances, to function as nonionic surfactants; and have been suggested as being suitable for use in certain specially formulated detergent compositions. See in this regard, for example, Published  
15 European Patent Application Numbers 0070074; 0070075; 0070076; and 0070077, all of which published on January 19, 1983 as well as Published European Patent Application Numbers 0076994; 0076995; and 0075996 which published on April 6, 1983.

20 A relatively specialized category of cleaning composition of interest to the art is one which is often referred to as a liquid detergent hard surface cleaning composition and which is specifically designed or formulated such that it can be applied to a soiled hard  
25 surface of interest (e.g., glass, painted walls, woodwork, etc.) and removed therefrom (for example as by wiping with a dry or damp cloth) without a subsequent rinsing operation and without leaving a significant or unsightly residual film upon the surface after cleaning.  
30 Thus, for example, in Published South African Patent Application No. 666,781 there is described a hard surface cleaner composition which comprises from 1-10% of an anionic surfactant (e.g., alkyl sulfate or alkyl aryl

-2-

5 sulphonate) or a nonionic surfactant (e.g., an ethylene oxide condensate of a fatty alcohol or of an alkyl phenol) and at least 20% of a 1:1 to 4:1 ratio mixture of an alkali metal (or ammonium) borate and sodium carbonate and which, at a 1% concentration in water, has a pH of at least 9.6.

10 On the other hand, U. S. Patent 3,591,510 to William Edward Zenk (Issued July 6, 1971) describes certain liquid hard surface cleaning compositions consisting essentially of from about 0.25 to 4% of certain selected anionic or zwitterionic detergents; from about 0.5 to about 6% of certain water soluble builder components; 15 from about 1 to about 10% of certain selected organic solvents or solvent mixtures; and the balance being water.

20 In a recent journal article, namely "A Greasy Soil Hard Surface Cleaning Test" by Morris A. Johnson, JAOCS, Vol. 61, No. 4, pages 810-813 (April 1984), a series of commercially available solvent-based and water-based cleaners were tested for greasy soil removal effectiveness at various dilution ratios.

25 Hard surface cleaning formulations are also discussed in "Formulation of Hard Surface Spray Cleaners" by R. E. Johnson and E. T. Clayton, detergents and specialties, June 1969, pages 28-32 and 56. Formulations discussed in such article included (a) one which was composed of 1 weight percent of a nonionic 30 surfactant (linear alcohol ethoxylate), 2.5 weight percent of anhydrous tetrapotassium pyrophosphate (builder), 5 weight percent of ethylene glycol monobutyl ether (solvent) and the balance water and (b) another which

-3-

was the same as the former except that the indicated  
nonionic surfactant was replaced with a corresponding  
5 amount of a linear alkylbenzenesulfonate anionic  
surfactant. In said article, it is noted that the afore-  
mentioned nonionic surfactant-based formulation exhibited  
slightly more filming (i.e., being given a "moderate" film  
rating) than its corresponding anionic surfactant-based  
10 counter-part (which obtained a "moderate-good" film  
rating).

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### SUMMARY OF THE INVENTION

It has now been discovered that the use of nonionic glycoside surfactants in certain hard surface liquid cleaning compositions provides compositions which have excellent cleaning characteristics and which also have an unexpectedly and/or surprisingly low propensity to deposit or leave an undesirable residual film upon hard surfaces cleaned therewith, even in the absence of a separate rinsing step or operation. Accordingly, the present invention, in one of its aspects, is a liquid detergent composition which comprises:

- (a) a nonionic surfactant component, at least about 10 (preferably at least about 25, more preferably at least about 50 and more preferably still at least about 75) weight percent of which (on a total nonionic surfactant component weight basis) is a glycoside surfactant, said nonionic surfactant component typically constituting from about 0.1 to about 50 weight percent of the total weight of said detergent composition;
- (b) a water miscible organic solvent, typically in an amount of from about 0.1 to about 50 weight percent on a total detergent composition weight basis;
- (c) a water soluble detergent builder, typically in an amount of from about 0.1 to about 50 weight percent on a total detergent composition weight basis; and

-5-

- 5 (d) water, typically in the range of from about 10 to about 99.7 weight percent on a total detergent composition weight basis.

10 The detergent composition of the present invention can, if desired, suitably take the form of a dilutable liquid concentrate for the purposes of its convenient and economical initial manufacturing or formulation operations, transport or distribution, and/or marketing and can then be subsequently diluted (e.g., by the final distributor or the ultimate user) with water prior to its ultimate use for hard surface cleaning purposes.

15 In their aforementioned concentrated form, the compositions of the present invention will typically comprise, on a total concentrate composition weight basis:

- 20 a. from about 5 to about 50 (preferably from about 5 to about 30) weight percent of the aforementioned nonionic surfactant component;
- 25 b. from about 10 to about 50 (preferably from about 10 to about 30) weight percent of the water miscible organic solvent;
- c. from about 10 to about 50 (preferably from about 10 to about 30) weight percent of the water soluble detergent builder; and
- 30 d. from about 10 to about 75 (preferably from about 20 to about 60 and most preferably from about 30 or 40 to about 50 or 55) weight percent water.

-6-

On the other hand, the compositions of the present invention in their diluted form for ultimate hand surface cleaning purpose will typically comprise, on a total diluted composition weight basis:

- a. from about 0.1 to about 10 (preferably from about 1 to about 5) weight percent of the above-identified nonionic surfactant component;
- 10      b. from about 0.1 to about 10 (preferably from about 1 to about 5) weight percent of said water miscible organic solvent;
- c. from about 0.1 to about 10 (preferably from about 1 to about 5) weight percent of said
- 15      d. water soluble detergent builder; and
- d. from about 60 to about 99.7 (preferably from about 60 to about 97) weight percent water.

In another of its broad aspects, the present invention is also represented by a method for cleaning a soiled hard surface by the application thereto and the subsequent removal therefrom of an effective amount of the above-described, diluted-form hard surface cleaning composition of the instant invention.

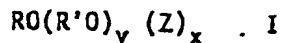
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### DETAILED DESCRIPTION OF THE INVENTION

Glycoside surfactants suitable for use as a  
5 significant proportion (e.g. at least about 10 weight  
percent, preferably at least about 25 weight percent,  
more preferably at least about 50 weight percent, even  
more preferably at least about 75 weight percent and  
most preferably constituting essentially all) of the  
10 nonionic surfactant component of the present invention  
include those of the formula:



wherein R is a monovalent organic radical (e.g., a  
monovalent saturated aliphatic, unsaturated aliphatic or  
aromatic radical such as alkyl, hydroxyalkyl, alkenyl,  
15 hydroxyalkenyl aryl, alkylaryl, hydroxyalkylaryl,  
arylalkyl, alkenylaryl, arylalkenyl, etc.) containing from  
about 6 to about 30 (preferably from about 8 to about 18  
and more preferably from about 9 to about 13) carbon  
atoms; R' is a divalent hydrocarbon radical containing  
20 from 2 to about 4 carbon atoms such as ethylene,  
propylene or butylene (most preferably, the unit (R'O)<sub>y</sub>  
represents repeating units of ethylene oxide, propylene  
oxide and/or random or block combinations thereof); y is  
25 a number having an average value of from 0 to about 12;  
Z represents a moiety derived from a reducing  
saccharide containing 5 or 6 carbon atoms (most  
preferably a glucose unit); and x is a number having an  
average value of from 1 to about 10 (most preferably  
30 from 1 to about 3).

Glycoside surfactants of the sort mentioned  
above, and various preferred subgenera thereof, are  
fully discussed in U. S. Patent 4,483,779 to Llenado et

-8-

al. (issued November 20, 1984), the discussion and description of which are hereby incorporated by reference.

Nonionic glycoside surfactants of particular interest for use in the practice of the present invention preferably have a hydrophilic-lipophilic balance (HLB) in the range of from about 10 to about 18 and most preferably in the range of from about 12 to about 14.

As is implied above, conventional nonionic surfactants different from the above-described glycoside type can, if desired, optionally be employed in conjunction with (i.e., as a nonionic cosurfactant with) the aforementioned glycoside surfactants so long as the amount of such nonionic cosurfactant is controlled to a sufficiently low level so as to avoid causing the resulting formulation to have an unacceptable propensity to leave a visually detectable (or unacceptable) residual film following the use of same, in diluted form, in hard surface cleaning applications. Surprisingly, it has been found that even conventional nonionic cosurfactants which by themselves have an unacceptably high propensity to leave a visually unacceptable residual film when used as the sole nonionic surfactant in hard surface cleaning compositions can, when used in conjunction with glycoside surfactants in accordance with the present invention, constitute as much as about 90 weight percent (preferably about 75 percent or less and most preferably about 50 percent or less) of the total weight of the nonionic surfactant component without imparting unacceptably high residual film-forming properties to the resulting hard surface cleaning composition of interest.

-9-

Examples of conventional nonionic surfactants suitable for use as optional nonionic cosurfactants in the fashion set forth above include:

(1) The polyethylene oxide condensates of alkyl phenols. These compounds include the condensation products of alkyl phenols having an alkyl group containing from about 6 to 12 carbon atoms in either a straight chain or branched chain configuration with ethylene oxide, said ethylene oxide being present in an amount equal to 5 to 25 moles of ethylene oxide per mole of alkyl phenol.

(2) The condensation products of aliphatic alcohols with from about 1 to about 25 moles of ethylene oxide. The alkyl chain of the aliphatic alcohol can either be straight or branched, primary or secondary, and generally contains from about 8 to about 22 carbon atoms.

Preferably, the aforementioned optional nonionic cosurfactants have an HLB of from about 5 to about 17.

In a similar fashion, conventional anionic surfactants can also be optionally included in the hard surface cleaning compositions of the present invention so long as the amount and nature of the anionic surfactant so employed does not serve to impart unacceptable residual film forming properties to the resulting hard surface cleaning composition.

Water miscible organic solvents suitable for use in the compositions of the present invention include alkylene glycols and/or ethers thereof such as, for example, ethylene glycol mono-n-butyl ether, ethylene

-10-

glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol mono-n-hexyl ether, propylene glycol monomethyl ether, propylene glycol monoethyl ether, isopropylene glycol monoethyl or monopropyl or monobutyl ether, etc; polyalkylene glycols and/or ethers thereof such as, for example, diethylene glycol monoethyl or monopropyl or monobutyl ether, di- or tripropylene glycol monomethyl ether, di- or tripropylene glycol monoethyl ether, etc.; t-butyl alcohol; tetrahydrofurfuryl alcohol; N-methyl-2-pyrrolidone; and the like.

Water soluble detergent builders suitable for use herein include the various water soluble alkali metal, ammonium or substituted ammonium phosphates, polyphosphates, phosphonates, polyphosphonates, carbonates, silicates, borates, polyhydroxysulfonates, polyacetates, carboxylates, and polycarboxylates. Preferred are the alkali metal, especially sodium, salts of the above.

Specific examples of suitable water soluble inorganic phosphate builders are sodium and potassium tripolyphosphate, pyrophosphate, polymeric metaphosphates having a degree of polymerization of from about 6 to 21, and orthophosphate. Examples of polyphosphonate builders are the sodium and potassium salts of ethylene-1, 1-diphosphonic acid, the sodium and potassium salts of ethane-1,1,2-triphosphonic acid.

Examples of suitable water soluble nonphosphorus, inorganic builders for use herein include sodium and potassium carbonate, bicarbonate, sesquicarbonate, tetraborate decahydrate, and silicate having a molar ratio

-11-

of  $\text{SiO}_2$  to alkali metal oxide of from about 0.5 to about 4.0, preferably from about 1.0 to about 2.4.

5           Water soluble, nonphosphorus organic builders useful herein also include the various alkali metal, ammonium and substituted ammonium polyacetates, carboxylates, polycarboxylates and polyhydroxysulfonates. Examples of polyacetate and polycarboxylate  
10 builders are the sodium, potassium, lithium, ammonium and substituted ammonium salts of ethylenediamine tetraacetic acid, nitrilotriacetic acid, oxydisuccinic acid, mellitic acid, benzene polycarboxylic acids, and citric acid.

15           Polycarboxylate builders suitable for use herein also include those set forth in U. S. Patent No. 3,308,067, Diehl, issued March 7, 1967 incorporated herein by reference. Such materials include the water-soluble salts of homo- and copolymers of aliphatic  
20 carboxylic acids such as maleic acid, itaconic acid, mesaconic acid, fumaric acid, aconitic acid, citraconic acid and methylenemalononic acid.

          Other builders include the carboxylated carbohydrates of U. S. Patent 3,723,322 Diehl incorporated  
25 herein by reference.

          Other builders useful herein are sodium and potassium carboxymethyloxymalonate, carboxymethyloxysuccinate, cis-cyclohexanehexacarboxylate, cis-cyclopentanetetracarboxylate, phloroglucinol trisulfonate,  
30 water-soluble polyacrylates (having molecular weights of from about 2,000 to about 200,000 for example), and the copolymers of maleic anhydride with vinyl methyl ether or ethylene.

-12-

Other suitable polycarboxylates for use herein are the polyacetal carboxylates described in U. S. Patent 5 4,144,226, issued March 13, 1979 to Crutchfield et al, and U. S. Patent 4,146,495, issued March 27, 1979 to Crutchfield et al, both incorporated herein by reference.

Other detergency builder materials useful herein are the "seeded builder" compositions disclosed in 10 Belgian Patent No. 798,856, issued October 29, 1973, incorporated herein by reference. Specific examples of such seeded builder mixtures are: 3:1 wt. mixtures of sodium carbonate and calcium carbonate having 5 micron particle diameter; 2.7:1 wt. mixtures of sodium sesqui- 15 carbonate and calcium carbonate having a particle diameter of 0.5 microns; 20:1 wt. mixtures of sodium sesquicarbonate and calcium hydroxide having a particle diameter of 0.01 micron; and a 3:3:1 wt. mixture of sodium carbonate, sodium aluminate and calcium oxide 20 having a particle diameter of 5 microns.

The liquid hard surface cleaning compositions of the present invention can, if desired in a given instance, optionally include (typically in relatively minor proportions), one or more of the various known types of 25 supplemental ingredients or additives such as, for example, hydrotropes (e.g., water soluble salts of low molecular weight organic acids such as the sodium or potassium salts of toluene-, benzene-, or cumene sulfonic acid, sodium or potassium sulfosuccinate, etc.); 30 perfumes; dyes or colorants; thickeners and/or soil suspending agents (e.g. carboxymethyl cellulose, sodium polyacrylate, polyethylene glycols having molecular weights of from about 400 to about 100,000);

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-13-

deodorizers; ammonia; germicides; antioxidants; aerosol propellants; and the like.

5 In the preparation of the liquid hard surface cleaning compositions of the present invention, there is no criticality associated with the order of ingredient addition or the technique employed in manufacturing or  
10 formulating same and such can therefore be accomplished in any fashion that may be convenient or expedient under the circumstances to provide the subject composition of interest in the form of a stable, homogeneous aqueous solution thereof. As a general rule, however,  
15 it will typically be convenient to first admix the water and the water miscible organic solvent together and to thereafter add thereto (and dissolve therein) the remainder of the ingredients to be employed within the subject liquid hard surface cleaning composition.

As has been noted above, the hard surface  
20 cleaning compositions of the present invention, if desired, can suitably be initially formulated, transported, distributed and/or marketed in the form of a dilutable aqueous concentrate composition and, in such event, can be diluted to the ultimately desired, end-use  
25 active ingredient strength by the eventual end-user or by a distributor at the retail or wholesale level. Alternatively, the liquid hard surface cleaning compositions hereof can also suitably be initially and directly manufactured or formulated, transported, marketed and used  
30 or consumed in its pre-diluted, ready-to-use form as previously described in accordance with the present invention.

-14-

5 The above-described hard surface cleaning compositions provide efficient and effective cleaning of soiled hard surfaces (such as, for example, glass, painted walls, stove tops, woodwork, ceramic tile, appliance housings, etc.) without rinsing and without leaving an objectionable residual film upon such surfaces after cleaning.

10 In evaluating the relative cleaning effectiveness of the subject cleaning compositions, it is convenient to employ a Gardener Washability Apparatus (using a standard soil tile and at standard pressure and sponge stroke settings), to determine or quantify the cleaning efficiency of a given cleaning composition of interest. In determining the cleaning efficiency, reflectance values are determined using a Gardener Lab Scan Reflectometer for each of the following: a clean unsoiled panel, a soiled panel and a soiled panel following Gardener Washability Apparatus scrubbing. Such reflectance values are then employed to calculate % cleaning efficiency according to the following formula:

$$\% \text{ cleaning efficiency} = \frac{R_w - R_s}{R_o - R_s} \times 100\%$$

25 wherein:

$R_w$  = Reflectance of the washed tile or panel  
 $R_s$  = Reflectance of the soiled tile or panel  
and  $R_o$  = Reflectance of the clean, unsoiled tile or panel.

30 The propensity of a given hard surface cleaning composition of interest to leave an undesired residual film upon a surface following cleaning (i.e., spray on -



-15-

wipe off with no rinsing) therewith is conveniently determined by applying 10 drops of the cleaning formulation of interest upon the surface of a 4" x 4" black ceramic tile; wiping dry using 20 strokes with an adsorbent paper towel; and measuring the gloss of the tile surface using a Glossgard II Glossmeter. The gloss reading of the black tile surface is determined both before and after application (and wiping off) of the cleaning formulation of interest. The difference in gloss reading as between the before treatment reading and the after treatment reading is determined and is recorded as "% Gloss Reduction".

Filming propensity of various cleaning formulations of interest can also be evaluated visually by visually inspecting the aforementioned black ceramic tile following application thereto (and removal or wiping therefrom) of the cleaning formulation and visually categorizing the degree of filming propensity as either "heavy", "moderate", "light", "trace" or "no filming" or as being at borderline locations in between two of the aforestated categories.

The present invention is further illustrated and understood by reference to the following examples thereof in which all parts and percentages are on a weight basis unless otherwise indicated.

-16-

EXAMPLE 1

5 In this example, a liquid hard surface cleaning composition, Example 1, is prepared by formulating a homogeneous aqueous solution containing:

- 10 a. 2 parts by weight of a glycoside surfactant of the formula:  $RO (R'O)_y (Z)_x$  wherein RO represents the residue of a mixture of fatty alcohols predominantly composed of  $C_9$  to  $C_{11}$  fatty alcohols, y is zero, Z is the residue of a glucose unit; and x has an average value of 1.3;
- 15 b. 2.5 parts by weight of ethylene diamine tetraacetic acid (tetra sodium salt form) as a water soluble builder;
- c. 5 parts by weight of ethylene glycol monobutyl ether as a water miscible organic solvent; and
- 20 d. 90.5 parts by weight water.

For comparative purposes, a second formulation (Control 1) is prepared which corresponds to that of Example 1 above except that 2 parts by weight of an ethoxylated  $C_{12}$ - $C_{15}$  mixed fatty alcohol nonionic  
25 surfactant (7 moles ethylene oxide per mole of fatty alcohol) is used in place of the glycoside surfactant.

Each of the resulting formulations are tested for % Cleaning Efficiency and residual filming propensity in accordance with the test procedures set forth  
30 hereinabove. The results of such testing are summarized in Table below.

-17-

Table I

	<u>Sample</u>	<u>% Gloss Reduction</u>	<u>Visual Film Rating</u>	<u>% Cleaning Efficiency</u>	
				<u>Full Strength (25 ml, 10 cycle)</u>	<u>1:9 Dilution (200 ml, 50 cycle)</u>
10	Example 1	4.2%	Trace- Light	62.2	64.5
	Control 1	40.7%	Moderate- Heavy	61.8	63.9

As can be seen, the composition of Example 1 exhibits cleaning efficiency comparable to that of Control 1 but at the same time exhibits a noteworthy and dramatically reduced propensity toward residual film formation.

-18-

EXAMPLES 2 - 6

The procedure of Example 1 above is repeated  
5 for the various hard surface cleaning formulations set  
forth in Table below. The % Gloss Reduction and  
Visual Film Rating results for the various formulations  
are also summarized in Table below.

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TABLE II

FORMULATION

<u>Ingredients</u> <sup>4</sup>	<u>Example 2</u>	<u>Example 3</u>	<u>Example 4</u>	<u>Example 5</u>	<u>Example 6</u>	<u>Control 2</u>
Glycoside Surfactant <sup>1</sup>	2.0	1.8	1.5	1.0	0.5	None
Ethoxylated C <sub>12</sub> -C <sub>15</sub> Fatty Alcohol <sup>2</sup>	None	0.2	0.5	1.0	1.5	2.0
Water Soluble Builder <sup>3</sup>	2.5	2.5	2.5	2.5	2.5	2.5
Water Miscible Organic Solvent <sup>3</sup>	5.0	5.0	5.0	5.0	5.0	5.0
Water	90.5	90.5	90.5	90.5	90.5	90.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

-19-

FILMING PROPERTIES

% Gloss Reduction	0.5%	0.9%	2.6%	2.8%	10.6%	39%
Visual Film Rating	No Filming- Trace	No Filming- Trace	Trace	Trace- Light	Light	Moderate- Heavy

1. Similar to that used in Example 1.
2. Tetrasodium salt of ethylene diamine tetraacetic acid.
3. Ethylene glycol monobutyl ether.
4. Ingredients amounts stated in parts by weight.

-20-

As is seen from the results in Table , hard  
surface liquid cleaning compositions of the present  
5 invention (i.e., Examples 2 - 6) exhibit notably reduced  
residual filming propensity relative to that exhibited by  
the comparative composition (i.e., Control 2).

While the present invention has been described  
and illustrated by reference to certain specific embodi-  
10 ments and examples thereof, such is not to be interpret-  
ed as in any way limiting the scope of the instantly  
claimed invention.

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-21-

## WHAT IS CLAIMED IS:

1. A liquid detergent composition comprising, on a total weight basis:

(a) from about 0.1 to about 50 weight percent of a nonionic surfactant component at least about 10 weight percent of which, on a total nonionic surfactant component weight basis, is a glycoside surfactant;

(b) from about 0.1 to about 50 weight percent of a water miscible organic solvent;

(c) from about 0.1 to about 50 weight percent of a water soluble detergent builder; and

(d) from about 10 to about 99.7 weight percent water.

2. The liquid detergent composition of Claim 1 in the form of a dilutable liquid concentrate which comprises, on a total weight basis:

(a) from about 5 to about 50 weight percent of the nonionic surfactant component;

(b) from about 10 to about 50 weight percent of the water miscible organic solvent;

(c) from about 10 to about 50 weight percent of the water soluble detergent builder; and

(d) from about 10 to about 75 weight percent water.

3. The dilutable liquid detergent concentrate composition of Claim 2 which comprises, on a total weight basis:

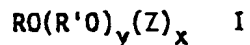
-22-

- 5 (a) from about 5 to about 30 weight percent of the nonionic surfactant component;
- (b) from about 10 to about 30 weight percent of the water miscible organic solvent;
- 10 (c) from about 10 to about 30 weight percent of the water soluble detergent builder; and
- (d) from about 10 to about 75 weight percent water.

4. The liquid detergent composition of Claim 1 in the form of a ready to use hard surface cleaner which comprises, on a total weight basis:

- 5 (a) from about 0.1 to about 10 weight percent of the nonionic surfactant component;
- (b) from about 0.1 to about 10 weight percent of the water miscible organic solvent;
- 10 (c) from about 0.1 to about 10 weight percent of the water soluble detergent builder; and
- (d) from about 60 to about 99.7 weight percent water.

5. The composition of Claim 1 wherein the glycoside surfactant corresponds to the formula:



5 wherein R is a monovalent organic radical containing from about 6 to about 30 carbon atoms; R' is a divalent hydrocarbon radical containing from 2 to about 4 carbon atoms; y is a number having an average value of from, 0



-23-

10 to about 12; Z is a moiety derived from a reducing  
saccharide containing 5 or 6 carbon atoms; and x is a  
number having an average value of from 1 to about 10.

5 6. The composition of Claim 5 wherein, in  
the glycoside surfactant of the Formula , R is an alkyl  
group containing from about 9 to about 13 carbon atoms;  
y is zero; Z is derived from glucose; and x has an  
average value of from 1 to about 3.

7. The composition of Claim 1 wherein the  
glycoside surfactant constitutes at least about 50 weight  
percent of the nonionic surfactant component.

8. The composition of Claim 1 wherein the  
glycoside surfactant constitutes at least about 75 weight  
percent of the nonionic surfactant component.

9. The composition of Claim 1 wherein the  
nonionic surfactant component consists essentially of said  
glycoside surfactant.

5 10. A method for cleaning a soiled hard  
surface which comprises applying thereto and subse-  
quently removing therefrom an effective amount of a  
liquid detergent composition comprising, on a total  
weight basis;

- 10 (a) from about 0.1 to about 10 weight per-  
cent of a nonionic surfactant component  
at least about 10 weight percent of  
which, on a total nonionic surfactant  
component weight basis, is a glycoside  
surfactant;
- (b) from about 0.1 to about 10 weight per-  
cent of a water miscible organic solvent;

-24-

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- (c) from about 0.1 to about 10 weight percent of a water soluble detergent builder; and
- (d) from about 60 to about 99.7 weight percent water.

## AMENDED CLAIMS

[received by the International Bureau on 27 March 1986 (27.03.86);  
original claims 1 and 10 amended; other claims unchanged (2 pages)]

1. A liquid detergent composition comprising, on a total weight basis:

- 5 (a) from about 0.1 to about 50 weight percent of a nonionic surfactant component at least about 10 weight percent of which, on a total nonionic surfactant component weight basis, is a glycoside surfactant;
- 10 (b) from about 0.1 to about 50 weight percent of a water miscible organic solvent selected from the group consisting of alkylene glycol ether solvents and polyalkylene glycol ether solvents;
- (c) from about 0.1 to about 50 weight percent of a water soluble detergent builder; and
- 15 (d) from about 10 to about 99.7 weight percent water.

2. The liquid detergent composition of Claim 1 in the form of a dilutable liquid concentrate which comprises, on a total weight basis:

- 5 (a) from about 5 to about 50 weight percent of the nonionic surfactant component;
- (b) from about 10 to about 50 weight percent of the water miscible organic solvent;
- (c) from about 10 to about 50 weight percent of the water soluble detergent builder; and
- 10 (d) from about 10 to about 75 weight percent water.

3. The dilutable liquid detergent concentrate composition of Claim 2 which comprises, on a total weight basis:

5 to about 12; Z is a moiety derived from a reducing  
saccharide containing 5 or 6 carbon atoms; and x is a  
number having an average value of from 1 to about 10.

6. The composition of Claim 5 wherein, in  
the glycoside surfactant of the Formula , R is an alkyl  
group containing from about 9 to about 13 carbon atoms;  
y is zero; Z is derived from glucose; and x has an  
5 average value of from 1 to about 3.

7. The composition of Claim 1 wherein the  
glycoside surfactant constitutes at least about 50 weight  
percent of the nonionic surfactant component.

8. The composition of Claim 1 wherein the  
glycoside surfactant constitutes at least about 75 weight  
percent of the nonionic surfactant component.

9. The composition of Claim 1 wherein the  
nonionic surfactant component consists essentially of said  
glycoside surfactant.

10. A method for cleaning a soiled hard  
surface which comprises applying thereto and subse-  
quently removing therefrom an effective amount of a  
liquid detergent composition comprising, on a total  
5 weight basis;

(a) from about 0.1 to about 10 weight percent of a  
nonionic surfactant component at least about 10  
weight percent of which, on a total nonionic  
surfactant component weight basis, is a  
10 glycoside surfactant;

(b) from about 0.1 to about 10 weight percent of a  
water miscible organic solvent selected from  
the group consisting of alkylene glycol ether  
solvents and polyalkylene glycol ether  
15 solvents;

# INTERNATIONAL SEARCH REPORT

International Application No PCT/US86/00012

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
INT. CL. 4 C11D 1/72, 3/04, 3/33, 3/43		
U.S. CL. 252/174.17, 174.21, 174.22, 139, 170, 171		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
U.S.	252/139, 174.17, 174.21, 174.22, 170, 171, Digest 2, Digest 14	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 14		
Category *	Citation of Document, 14 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No. 15
X	EP, A, 0 106 692 PUBLISHED 25 APRIL 1984 JONES; See pages 17 and 18, Examples B, D, E, F and page 12, Example C & D.	1-9
X	EP, A, 0 105 556 PUBLISHED 18 APRIL 1984 JONES; See page 15, lines 6-15 and claim 1.	1-9
X	US, A, 4,483,779 PUBLISHED 20 NOVEMBER 1984 LLENADO ET AL; See Col. 19, Example XII.	1-9
X	US, A, 4,483,780 PUBLISHED 20 NOVEMBER 1984 LLENADO; See Col. 19, Example XII.	1-9
X	US, A, 4,483,787 PUBLISHED 20 NOVEMBER 1984 JONES; See Col. 5, Examples V and VI.	1-9
A	US, A, 3,591,510 PUBLISHED 06 JULY 1971 ZENK	1-9
A	US, A, 3,721,633 PUBLISHED 20 MARCH 1973 RANAUTO	1-9
<p>* Special categories of cited documents: 14</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Z" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search *		Date of Mailing of this International Search Report *
05 MARCH 1986		13 MAR 1986
International Searching Authority :		Signature of Authorized Officer 16
ISA/US		Prince Willis

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No <sup>18</sup>
A	US, A, 3,882,038 PUBLISHED 06 MAY 1975 CLAYTON ET AL	1-9
A	US, A, 4,147,652 PUBLISHED 03 APRIL 1979 KANIECKI	1-9
A	US, A, 4,493,773 PUBLISHED 15 JANUARY 1985 COOK ET AL	1-9
A	N, Detergent and Specialties, issued 1969 June, R.E. JOHNSON ET AL, Formulation of Hard Surface Spray Cleaners, pages 28, 30, 32 and 56.	1-10